CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

SOLUTIONS

Example

1. 3.65g of HCl are dissolved in 2 lit of the solution. Find the molarity of the solution ?

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2. 10.6 g Na_2CO_3 are dissolved in water to give 2 M solution. What is the volume of the solution in ml?

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3. Calculate the weight of NaOH present in 500ml of 0.2 M NaOH solution.

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4. Find the no. of moles of the solute present in 500ml of 0.1 M solution.

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5. Calculate the molarity of 4% (w/v) NaOH solution.

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6. 100 ml, 0.1M H_2SO_4 is exactly neutralized by 100 ml of NaOH solution. Calculate the molarity of NaOH solution.

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7. 200 ml of $KMnO_4$ solution is exactly reduced by 100 ml, 0.5M oxalic acid solution. Find the molarity of $KMnO_4$ solution.

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8. How much water must be added to 2lit of decimolar NaOH to get centimolar NaOH solution

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9. Calculate the molarity of a mixed solution by adding 150 ml of 0.1M HCl to 200 ml of 0.2 M HCl solution.

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10. What is the molarity of a solution of H_2SO_4 which has density of 1.84g/ml and contains 98% (w/ w) H_2SO_4 solution.

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11. Calculate the normality of H_2SO_4 solution containing 4.9 g per litre of solution ?

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12. Calculate the weight of NaOH present in 500 ml of 0.5 N solution.

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13. Calculate the normality of 4% (w/v) solution of NaOH.

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14. To convert 1 litre of 1.123N solution of an acid into 1N solution, how much volume of water should be added ?

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15. 20. ml of 0.2 N HCl and 40 ml of 0.4 N HNO_3 are mixed and the solution is diluted up to 100 ml. Calculate the normality of the soluton. ?

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16. What volumes of 10N HCl and 2N HCl should you mix to obtain 4 litres of 5N HCl solution ?

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17. 0.46g of Ethanol is dissolved in 1000 g of H_2O. What is the molality of the ethanol solution ?

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18. Calculate the molality of a 9.8% (w/w) solution of H_2SO_4.

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19. The density of 4% (w/v) NaOH solution is 1.02 g/ml. What is the molality of the solution ?

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20. 100 ml of ethyl alcohol is made upto a litre with distilled water. If the density of the ethyl alcohol is 0.46g/ml. What is the molality of the solution ?

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21. Calculate the mole fraction of H_2SO_4 in a solution containing $98\ \%\ H_2SO_4$ by mass.

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22. Drinking a hot beverage is easy and quick from a saucer than from a cup. Why ?

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23. p° and p are vapour pressure of pure liquid and solution respectively. Among (a) p°, (b) p/p° and (c) $(p^\circ - p)/p^\circ$, which are temperature independent. Why ?

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24. At $70^\circ C$ vapour pressure of pure benezene and pure toluene are 500 torr and 200 torr, respectively. In a homogeneous mixture of toluene with benzene at $70^\circ C$, the mole fraction of benezene is 0.4. Calculate the vapour pressure of the mixture.

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25. Vapour pressure of pure water at $23^{\circ} C$ is 19.8 torr . Calculate the vapour of 3m aqueous solution.

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26. Vapour pressure of pure water at $27^{\circ} C$ is 3000k Pa. By dissolving 5 g of a non volatile molecular solid in 100 g of water the vapour pressure is decreased to 2985 k Pa. What si the molecular weight of solute?

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27. Calculate the vapour pressure of 10% (w/w) aqueous glucose solution at $30^{\circ} C$, if vapour pressure of pure water is 31.8 mm.

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28. Methanol and ethanol are liquids of similar nature, but a mixture of them is a non-ideal solution. Why?

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29. Vapour pressure of pure liquids P and Q are 700 and 450 mm Hg respectively at 330K. What is the composition of the liquid mixture at 330 K, if the total vapour pressure is 600 mm Hg?

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30. What is the influence of added non-volatile solute on the boiling point of solvent ?

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31. One litre solution X has x g of urea dissolved in it. Another one litre solution Y has xg of KCl dissolved in it. Find the ratio of lowering of vapour pressures of the solutions X and Y.

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32. 1.2 mL acetic acid having density 1.06 g cm^{-3} is dissolved in 1 litre of water. The depression in freezing point observed for this concentration of acid was $0.041^{\circ}C$. The van't Hoff factor of the acid is

(K_f of water = 1.86 K kg mol^{-1})

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33. K_b and K_f for water are respectively 0.52 and 1.80 kg mol^{-1} respectively. For an aqueous glycolic solution freezing point is $3.72^{\circ}C$. What is the boiling point of the solution ?

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34. 100 mL of an aqueous solution of protein contais 6.3 g of protein. Calculate the molar mass of protein if osmatic pressure of the solution at $27^{\circ} C$ is 2.57×10^{-3} bar.

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35. K_b for diethylether is 2.16 K kg mol^{-1}. Calculate the molar mass of solute when 0.4g of solute present in 40 g of ether, increased the boiling point of ether by 0.17 K.

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36. 2% of aqueous urea and 6% of aqueous 'X' are isotonic. If 'X' is a molecular solid, calculate its molar mass.

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37. In living cells which is dangerous, plasmolysis or haemolysis ?

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38. Which of the following is a colligative property

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39. If extent of dissociation of both KCl and $BaCl_2$ of some concentrations with identical value of α as 0.9, what is the ratio of their van't Hoff factors?

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40. At $10^{\circ}C$, the osmotic pressure of 1% (w/v) solution of 'X' is $7.87 \times 10^4 Nm^{-2}$. What is the molecular weight of solute X ?

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41. Molar masses of salutes are best measured from osmetic pressure. Why?

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42. Which among 1 molar NaCl and 1 molar Glucose which has greater colligative property and why?

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43. A solute 'X' is trimerised in a solvent. The experimental molar mass is than that of calculated mass.

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Subjective Exercise 1

1. Write the different types of solutions with suitable examples

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2. Define (a) mole fraction, (b) molality (c) molarity and (d) normality. Write their units.

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3. Write the necessary equations useful in (a) dilution, (b) mixtures and (c) in titrations.

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4. Calculate the mass of caustic soda present in 225 mL of 0.556 M solution.

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5. Calculate the mass of urea (NH_2CONH_2) required in making 2.5 kg of 0.25 molal queous solution.

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6. Concentration hydrochloric acid has 38% of HCl by weight with a density of 1.1885 g per ml. Calculate the molarity of the acid. What volume of the acid on dilution to one litre gives finally decimolar solution?

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7. Calculate the weights of solutes required to prepre one litre each of (a) 0.45 M $KMnO_4$ solution and (b) $0.25MCuSO_4$ solution.

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8. How much water is to be added to prepare 0.12 M solutions from 100 mL of 0.3 M solution?

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9. 4g of NaOH are dissolved in 4 lit of solution. Find the molarity of the solution.

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10. Calculate the weight of Na_2CO_3 present in 100ml of 0.1M Na_2CO_3 solution.

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11. 3.645g of HCl are dissolved in water to give 1M solution. What is the volume of the solution in ml?

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12. Calculate the molarity of 10.6% (w/v) Na_2CO_3 solution.

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13. Find the number of moles of the solute present in 600ml of 0.05M solution.

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14. Calculate the weight of sodium hydroxide present in 200ml of 0.5 M solution.

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15. How many grams of $Al_2(SO_4)_3$, will be required to prepare 4 litres of 0.025M solution ?

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16. How much water must be added to 100ml of 0.5M NaOH to get 0.2M NaOH solution.

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Subjective Exercise 2 Long Answer

1. What do you mean by vapour pressure of a liquid ? Describe the vapourization and condensation processes in a closed vessel. How does the vapour pressure change with temperature ?

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2. Define and explain Raoult's law. How is it useful in determining the molecular weight of a non - volatile solute ?

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3. Define Raoult's law for lowering of vapour pressure. How is the law useful in determining the molecular weight of a solvent when a known non - volatile solute is dissolved ?

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4. Define Solubility. Discuss the factors affecting solubility of gas in a liquid.

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Subjective Exercise 2 Short Answer

1. State and explain Raoult's law ?

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2. What is vapour pressure of a liquid ?

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3. What is the relation between vapour pressure of a liquid and its boiling point ?

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4. What is the relative lowering of vapour pressure ? How is it useful in determining the molecular weight of solute ?

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5. Write the formula for the simplified Raoult's law in terms of molecular weight of a solute.

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6. What is meant by an ideal solution ?

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7. Derive the relation between relative lowering of vapour pressure and molar mass of solute.

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8. State the explain Henry's law .

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9. Discuss the factors affecting solubility of solid in a liquid.

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10. Discuss the applications of Henry's law.

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11. What are Azeotropic mixtures? Discuss the following:

(a) Minimum boiling azeotropes

(b) Maximum boiling azerotropes

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Subjective Exercise 2 Very Short Answer

1. Define vapour pressure. How is it dependent on nature of solvent and temperature?

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2. State Raoult's law.

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3. Write any two limitations of Raoult's law ?

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4. A relation between vapour pressure and temperture is known as

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5. Define boiling point of a liquid, in terms of its vapour pressure.

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6. What is Henry's law constant?

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7. What are ideal solutions ? Give examples.

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8. What are Non Ideal Solutions? Give examples

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Subjective Exercise 2 Problems

1. 1.2 g of a non-volatile solute is added to 320 g of methyl alcohol at certain temperature. The vapour pressure is decreased from 400 mm to 399.2 mm Hg. Calculate the molecular weight of solute.

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2. The vapour pressure of 4% solution of a non-volatile solute in water at $100^{\circ} C$ is 745 mm. What is the molecular weight of solute?

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3. Calculate the vapour pressure , if 0.083 mole of a non-volatile solute is present in 80 g of ethanol at $25^{\circ} C$, Vapour pressure of ethanol is 22.45 mm.

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4. At room temperature, write the ascending order of volatility and vapour pressres of (A) water, (B) hexane and (C) ethanol. Explain the reasons.

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5. Relative lowering of a solution containing a non volatile solute (A) in a solvent (B) is 2%. What is the mole percentage of component 'B' in the solution.

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6. Calculate the vapour pressure of a solution containing 10gm of non-volatile solute in 80gm of ethanol of at 298K [The vapour pressure of pure ethanol at 298K is 22.45 mm and Molecular weight of solute is 120]

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7. The vapour pressure of H_2O at $20^\circ C$ is 17.54 mm of Hg. If the vapour pressure of solution containig 108.24 gm of non volatile solute in 1000 gm of H_2O at 20° is 17.354 mm of Hg. Find the moleculer weight of solute.

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8. At 300K, 10 gm of a solute dissolved in 100gm of benzene showed a lowering of 8.8 mm in benzene. Calculate the mass of solute [Vapour pressure of pure Benzene is 121.8 mm at 300K]

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9. The vapour pressure of an aqueous solution of cane sugar is 75.6 cm of Hg a $100^{\circ} C$. What is the molatity of solution.

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10. At $50^{\circ} C$ the vapour pressure of H_2O is 92mm Hg. The vapour pressure of a solution containing 18.1g of non volatile solute in 100ml H_2O at the same temperature is 87mm Hg. Find the molecular weight of the solute.

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Subjective Exercise 3 Long Answer

1. What are colligative properties ? Explain each of them with necessary examples.

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2. What is Osmosis ? Define Osmotic Pressure ? Describe Berkily- Hartley method of determining osmotic pressure.

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3. Describe Cottrell's method of determining molecular weight of non-volatile's solute.

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4. Explain with suitable examples giving reasons for the abnormal values of molar masses.

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5. Discuss Cottrell's method of evaluating elevation of boiling points.

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6. How is osmotic pressure determined by Berkeley-Hartley method?

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Subjective Exercise 3 Short Answer

1. What is meant by an ideal solution ?

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2. What are colligative properties ? Give their names.

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3. How is molar mass related to the elevation in boiling point of a solution ?

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4. Write the equation relating depression in freezing point of a solution and the molar mass of the solute. Explain the terms.

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5. What is Van't Hoffs factor 'i' and how is it related to $'\alpha'$ in the case of a binary electrolyte (1 : 1) ?

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6. What are : (a) osmosis and (b) osmatic pressure ?

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7. What are the Van't Hoff's laws of osmotic pressure ?

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8. Define the equation π= CRT

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Subjective Exercise 3 Very Short Answer

1. What are colligative properties ? Give their names.

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2. What is molal elevation constant ?

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3. What is molal depression constant ?

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4. Define osmotic pressure.

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5. Osmosis is

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6. What are abnormal molar masses? Why are the molar masses abnormal ?

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7. What is semi permeable membrane ? Give two examples.

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8. What is meant by abnormal behaviour of electrolytes in colligative properties ?

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9. Will the molecular weight determined for an ionizing solute be greater or lesser than that calculated by elevation of boiling point method ?

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10. What are isotonic solutions ? Give one example.

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11. Disccuss on reverse osmasis and water purification.

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Subjective Exercise 3 Problems

1. One liter aqueous solutions contains 2×10^{-2} kg glucose at $25^{\circ} C$. Calculate the osmotic pressure of the solution.

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2. When 5.141×10^{-4} Kg of anthracene is dissolved in 3.5×10^{-3} Kg of chloroform the BP of $CHCl_3$ is found to be increased by 0.325K. Find the

molecular weight of Anthracene. [$K_b = 3.9\text{K.Kg mole}^{-1}$]

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3. Camphor melts at $178^\circ C$ when 1gm A is added to 1000gm of camphor the mixture melts at $138^\circ C$ and when 0.01 gm B is added to 0.5 gm camphour the mixture melts at $168^\circ C$. Calculate the molecular weight of B?

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4. At 283 K, the osmotic pressure of 2% solution of X is $7.87 \times 10^4 Nm^{-2}$. Calculate molar mass of X.

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5. What is K_b, if 0.5 g of solute (molar mass 100g/mol) in 25g of solvent showed an elevation of 1°C in B.P.

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6. The elevation in boiling point of a solution containing 0.20g of solute in 20g of ether is $0.17^{\circ}C$, K_b for ether is 2.16 K kg/mol. Calculate the molar mass of solute.

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7. 3g of solute is dissolved in 22g of water. The depression if freezing point shown by the solution is 1.45K. What is the molar mass of solute ? K_f for water is = 1.86K kgmol^{-1}

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Objective Exercise 1

1. If air is taken as a binary solution, the solvent is

A. N_2

B. O_2

C. CO_2

D. H_2

Answer: A

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2. Homogeneous system among the following is

A. Milk

B. Sand in water

C. Urea in water

D. Benzene in water

Answer: C

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3. The physical change among the following is

A. Burning of coal

B. Burning of sulphur

C. Dissolution of Glucose in water

D. Burning of white phosphorus

Answer: C

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4. The characterstic property of solution is

(a) Formation of solution is physical change

(b) Solute and solvent in the solution can be separated by filtration

(c) Solute and solvent in the solution can be separated by decantation

(d) Solution can be represented with a chemical formula

A. a,b

B. a

C. b,d

D. c,d

Answer: B

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5. A mixture of salt and water can be separated by

A. Filtration

B. Decentation

C. Crystallisation

D. Kept long standing

Answer: C

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6. Which of the following differ from the others

A. Ruby

B. Magnalumin

C. Brass

D. Amalgam

Answer: A

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7. Occlusion of Hydrogen on Palladium is an example for .....type solution

A. gas in solid

B. solid in gas

C. gas in liquid

D. liquid in gas

Answer: A

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8.

LIST - 1	LIST - 2
A) Gaseous solution	1) German silver
B) Liquid solution	2) Milk
C) Solid solution	3) Sand in water
D) Colloidal solution	4) Aqueous Alcoholic solution
	5) Air

A. A-5,B-4,C-1,D-2

B. A-1,B-3,C-2,D-5

C. A-4,B-2,C-5,D-1

D. A-2,B-3,C-1,D-4

Answer: A

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9. The units of Molarity are

A. $\mathrm{gm.\ Lit}^{-1}$

B. mole. lit^{-1}

C. equivalent. lit^{-1}

D. mole. kg^{-1}

Answer: B

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10. To halve the molarity of a solution the following should be adopted

A. weight of the solute to be doubled

B. weight of the solvent to be doubled

C. volume of the solvent to be doubled

D. volume of the solution to be doubled

Answer: D

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11. Molarity of the liquid HCl if density of the solution is 1.17 g/cc is

A. 36.5

B. 18.25

C. 32.05

D. 42.1

Answer: A

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12. A student has 100mL of 0.1 M KCl solution. To make it 0.2 M, he has to

A. evaporate 50 mL of the solution

B. add 0.01 mole of KCl

C. both (a) and (b) can be used

D. neither (a) nor (b) can be used

Answer: B

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13. Density of 2.05M solution of acetic acid in water is 1.02 g/mL, the molality of that solution is

A. 2.28 mol kg^{-1}

B. 0.44 mol kg^{-1}

C. 1.14 mol kg^{-1}

D. 3.28 mol kg^{-1}

Answer: C

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14. The volume of decamolar aquous solutions of hydrochloric acid is required to prepare $2\mathrm{dm}^3$ of 5M HCl solution is

A. 0.5L

B. 1L

C. 2L

D. 3L

Answer: B

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15. The units of Normality are

A. mole. lit^{-1}

B. mole. Kg^{-1}

C. equivalent. lit^{-1}

D. equivalent. Kg^{-1}

Answer: C

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16. The following is not a fixed quantity

A. atomic weight of an element

B. equivalent weight of an element (or) compound

C. molecular weight of a compound

D. formula weight of a substance

Answer: B

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17. In the reaction $2NaOH + H_3PO_4 \rightarrow Na_2HPO_4 + 2H_2O$, the Equivalent weight of the acid is

A. 49

B. 98

C. 32.6

D. 36.5

Answer: A

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18. 5 ml of 1N HCl, 20 ml of N/2 H_2SO_4 and 30 ml of N/3 HNO_3 are mixed together and the volume made to one litre. The normality of the resulting solution is

A. N/5

B. N/10

C. N/20

D. N/40

Answer: D

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19. The volumes of 4N HCl and 10N HCl required to make 1L of 6 N HCl are

A. 0.75L of 4 N HCl and 0.25L of 10 N HCl

B. 0.25L of 4 N HCl and 0.75L of 10 N HCl

C. 0.67L of 4 N HCl and 0.33L of 10 N HCl

D. 0.80L of 4 N HCl and 0.20L of 10 N HCl

Answer: C

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20. Which of the following acid has the same molecular weight and equivalent weight

A. H_3PO_2

B. H_3PO_3

C. H_3PO_4

D. H_2SO_4

Answer: A

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21. M' is the molecular weight of $KMnO_4$ The equivalent weight of $KMnO_4$ when it reacts according to the equation

$2KMnO_4 + 3H_2SO_4 + 5H_2C_2O_4 \rightarrow K_2SO_4 + 2MnSO_4 + 8H_2O + 10CO$

A. M/2

B. M/3

C. M

D. M/5

Answer: D

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22. Molecular weight of $KMnO_4$ is "M". In a reaction $KMnO_4$ is reduced to K_2MnO_4. The equivalent weight of $KMnO_4$ is

A. M

B. M/2

C. M/3

D. M/5

Answer: A

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23. The equivalent weight of Hypo in the reaction $Na_2S_2O_3 + Cl_2 + H_2O \rightarrow Na_2SO_4 + 2HCl + S$ is [M = mol.wt]

A. M

B. M/2

C. M/3

D. 2M

Answer: B

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24. Molecular weight of Mohr's salt is 392. Its equivalent weight when it is oxidised by $KMnO_4$ in acidic medium is

A. 392

B. 196

C. 130.6

D. 78.5

Answer: A

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25. The equivalent weight of CH_4 in the reaction $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ is [M =mol.wt]

A. M/4

B. M/8

C. M/12

D. M/16

Answer: B

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26. The equivalent weight of $CuSO_4$ when it is converted to Cu_2I_2 [M = mol.wt]

A. M/1

B. M/2

C. M/3

D. 2M

Answer: A

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27. The number of millimoles of H_2SO_4 present in 5 litres of 0.2N H_2SO_4 solution is

A. 500

B. 1000

C. 250

D. 0.5×10^{-3}

Answer: A

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28. The units of molality are

A. mole. lit^{-1}

B. mole ml^{-1}

C. mole Kg^{-1}

D. equivalent Kg^{-1}

Answer: C

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29. The correct relationship between molarity (M) and molality (m) is (d = density of the solution, in KgL^{-1} , M_2 = molar mass of the solute in kg mol^{-1})

A. $M = \frac{md}{1 + mM_2}$

B. $M = \frac{m}{1 + mM_2 d}$

C. $M = \frac{1 + mM_2}{md}$

D. $M = \frac{1 + md}{mM_2}$

Answer: A

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30. A one molal solution is one that contains

A. 1 g. of the solute in 1000 g. of solvent

B. 1 g. mole of solute in 1000 ml of solution

C. 1 g. mole of solute 22.4 lits of solution

D. 1 g. mole of solute in 1000 g. of solvent

Answer: D

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31. Regarding molarity, which of the following statements are correct

(a) Units of molarity mol kg^{-1}

(b) Molarity of dibasic acid is half of its normality

(c) Normality x GEW / GMW

(d) Molarity always equals to its molality

A. a,b

B. a,b

C. b,c

D. a,c

Answer: C

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32. At $25^{\circ}C$ for a given solution M = m, then at $50^{\circ}C$ the correct relationship is

A. M=m

B. M $>$ m

C. $M < m$

D. M=2M

Answer: C

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33. To change the molal conc. to one half, one of the following should be adopted

A. weight of the solute should be doubled

B. weight of the solvent should be doubled

C. volume of the solvent should be doubled

D. weight of the solution should be doubled

Answer: B

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34. 0.1 gram mole of urea is dissolved in 100g. of water. The molality of the solution is

A. 1 m

B. 0.01 M

C. 0.01 m

D. 1.0 M

Answer: D

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35. M = molarity of the solution

m = molality of the solution

d = density of the solution (in g. ml^{-1})

M = gram molecular weight of solute

Which of the following relations is correct

A. $m = \frac{M}{1000d - MM^{-1}}$

B. $m = \frac{M \times 1000}{d + MM^{1}}$

C. $m = \frac{M \times 1000}{(1000 \times d) - MM^{1}}$

D. $M = \frac{m \times 1000}{(1000 \times d) - MM^{1}}$

Answer: C

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36. Calculate the molality of a 9.8% (w/w) solution of H_2SO_4.

A. 1M

B. 0.55 M

C. 0.1 M

D. 1.1 M

Answer: D

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37. If two substances A and B have $p_A^0 : p_B^0$ = 1: 2 and have mole fraction in solution 1: 2, then mole fraction of A in vapours is

A. 0.33

B. 0.25

C. 0.52

D. 0.2

Answer: D

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38. In which mode of expression, the concentration of solution remains independent of temperature?

A. Molarity

B. Normality

C. Formality

D. Molality

Answer: D

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39. 6g. of Urea is dissolved in 90g. of water. The mole fraction of solute is

A. $1/5$

B. $1/50$

C. $1/51$

D. $1/501$

Answer: C

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40. 0.1 mole of NaCl is dissolved in 100g of water. The mole fraction of NaCl is

A. 0.0213

B. 0.0177

C. 0.229

D. 0.033

Answer: A

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41. Incorrect statement is (K_H = Henry's constant)

A. K_H is characteristic constant for a given gas- solvent system

B. Higher is the value of K_H, Lower is solubility of gas for a given partial pressure of gas

C. K_H has temperature dependence

D. K_H decreases with temperature

Answer: A

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42. Which of the following statement is correct about Henry's law

A. It is applicable only when pressure is high

B. It is applicable only when temperature is very high

C. It is applicable only when gas reacts with the solvent

D. K_H (Henry's constant) is a function of the nature of the gas

Answer: D

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43.

LIST - 1	LIST - 2
A) Mole fraction	1) No.of g equivalents in 1000ml of solution
B) Molarity	2) Always less than one
C) Normality	3) Greater than or equal to molarity
D) Molality	4) No.of g moles present in 1000ml solution
	5) No.of g moles of solute 1kg of solvant

A. A-1,B-2,C-3,D-4

B. A-2,B-3,C-1,D-5

C. A-1,B-4,C-2,D-3

D. A-2,B-4,C-3,D-5

Answer: D

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44. If 0.05 mole of gas are dissolved in 500 grams of water under 1 atm. pressure, 0.1 moles will be dissolved if the pressure is 2atm. It illustrates

A. Graham's Law

B. Dalton's Law

C. Henry's Law

D. Boyle's Law

Answer: C

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45. In a nearly saturated solution, the solubility increases with increase in temperature, then ΔH sol. Is

A. $+Ve$

B. $-Ve$

C. $+Ve$ (or) -Ve

D. 0

Answer: B

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46. Among the following gases which gas has the highest Henry's law constant, K_H value in water at the same temperature ?

A. O_2

B. N_2

C. H_2

D. He

Answer: B

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47. The density of 20% (w/w) aqueous NaOH solution is 1.20 g.mL^{-1}. What is the mole fraction of water ? (molar mass of NaOH = 40g. mol^{-1})

A. 0.95

B. 0.90

C. 0.97

D. 0.94

Answer: C

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48. In a mixture of A and B, components show negative deviation when

A. A - B interaction is stonger than A-A and B - B interaction

B. A - B interaction is weaker than A -A and B - B interaction

C. $\Delta V_{\text{mix}} = 0, \Delta S_{\text{mix}} > 0$

D. $\Delta V_{\text{mix}} = 0, \Delta S_{\text{mix}} = 0$

Answer: A

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49. Which of the following liquid pairs shows a positive deviation from Raoults Law ?

A. Water - hydrochloric acid

B. Benzene - Methanol

C. Water - Nitric acid

D. Acetone-chloroform

Answer: B

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50. If liquid A and B form ideal solutions

A. the enthalpy of mixing is zero

B. the entropy of mixing is zero

C. the free energy of mixing is zero

D. the free energy as well as entropy of mixing are each zero.

Answer: A

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51. Among the following mixtures, dipole - dipole as major interactions is present in

A. KCl and water

B. Benzene and carbon tetrachloride

C. Benzene and ethanol

D. Acetonitrile and acetone

Answer: D

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52. Which has greater lowering of vapour pressure

A. 0.1m Urea

B. 0.1m Glucose

C. 0.1m Sucrose

D. equal in all cases

Answer: D

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53. The vapour pressure is least for

A. pure water

B. 0.1m aqueous urea

C. 0.2m aqueous urea

D. 0.3m aqueous urea

Answer: D

Watch Video Solution

54. Relative lowering of vapour pressure is maximum for

A. 0.1 m urea

B. 0.1 m NaCl

C. 0.1 m $MgCl_2$

D. 0.1 m $Al_2(SO_4)_3$

Answer: D

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55. Boiling point is least for

A. 0.1 m urea

B. 0.2 m urea

C. 0.1 m NaCl

D. 0.2 m $MgCl_2$

Answer: A

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56. A non-volatile solute (A) is dissolved in a volatile solvent (B). The vapour pressure of the resultant solution is P_s. The vapour pressure of pure solvent is P_B°. If X_B is the mole fraction of the solvent, which of the following is correct?

A. $P_S = P_B^0 . X_A$

B. $P_B^0 = P_S X_B$

C. $P_S = P_B^0 . X_B$

D. $P_B^0 = P_S X_A$

Answer: C

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57. A solution that obeys Raoult's law is called

A. normal solution

B. non-ideal solution

C. ideal solution

D. saturated solution

Answer: C

Watch Video Solution

58. If x_1 and x_2 represent the mole fraction of a component A in the vapour phase and liquid mixture respectively and p_A^0 and p_B^0 represent vapours pressures of pure A and pure B, then total vapour pressure of the liquid mixture is

A. $\frac{p_A^0 x_1}{x_2}$

B. $\frac{p_A^0 x_2}{x_1}$

C. $\frac{p_B^0 x_1}{x_2}$

D. $\frac{p_B^0 x_2}{x_1}$

Answer: B

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59. Two liquids X and Y form an ideal solution. The mixture has a vapour pressure of 400 mm at 300 K when mixed in the molar ratio of 1:1 and a vapour pressure of 350 mm when mixed in the molar ratio of 1: 2 at the

same temperature. The vapour pressures of the two pure liquids X and Y respectively are

A. 250 mm, 550 mm

B. 350 mm, 450 mm

C. 350 mm, 700mm

D. 550 mm, 250 mm

Answer: D

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LIST - 1	LIST - 2
A) Lowering of r vapour pressure	1) $\frac{P^{o} - P}{P^{o}}$
B) Relative lowering of vapour pressure	2) $\frac{P^{o} - P}{P^{o}} = \frac{w}{m} x \frac{M}{W}$
C) Raoult's law	3) $P^{o} - P$
D) Ideal solution	4) Obeying Raoults law
	5) Boiling point

60.

A. A-3,B-2,C-1,D-4

B. A-4,B-1,C-2,D-3

C. A-3,B-1,C-2,D-4

D. A-1,B-3,C-4,D-2

Answer: C

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61. X is a non- volatile solute and Y is a volatile solvent. The following vapour pressures are observed by dissolving X in Y

$\mathrm{X/mol\ lit^{-1}}$	$\mathrm{Y/mm\ of\ Hg}$
0.10	P_1
0.25	P_2
0.01	P_3

The correct order of vapour pressure is

A. $P_1 < P_2 < P_3$

B. $P_3 < P_2 < P_1$

C. $P_3 < P_1 < P_2$

D. $P_2 < P_1 < P_3$

Answer: D

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62. For an ideal solution of two components A and B, If x_A and y_A are mole fractions of component 'A' in solution and vapour phase

respectively, then the slope of linear line in the graph drawn between $1/x_A$ and $1/y_A$ is

A. $P_A^0 + P_B^0$

B. P_A^0 / P_B^0

C. $P_B^0 + P_A^0$

D. $P_A^0 - P_B^0$

Answer: B

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63. A liquid is in equilibrium with its vapour at its boiling point, on the average, the molecules in the two phases have equal

A. Inter molecular forces

B. Potential energy

C. Temperature

D. Kinetic energy

Answer: D

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64. 15 cm^3 of liquied 'x' and 20 cm^3 of liquid 'y' are mixed at $20^\circ C$ and the volume of solution was measured to be 35.1 cm^3 then correct reaction is

A. $\Delta H_{\text{mix}} < 0$, solution shows +ve deviation

B. $\Delta H_{\text{mix}} > 0$, solution shows +ve deviation

C. $\Delta H_{\text{mix}} < 0$, solution shows -ve deviation

D. $\Delta H_{\text{mix}} > 0$, solution shows -ve deviation

Answer: B

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65. Acetone (BP 329K) and CS_2 (BP 320K) are mixed in a definite composition so that the mixture of the two behave like pure liquid and boils at 312K, then it is

A. Not an Azeotrope

B. Maximum boiling azeotrope

C. Minimum boiling azeotrope

D. Rectified spirit

Answer: C

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66. Which one of the following is not correct ?

A. For an ideal solution $\Delta_{\text{mix}}H = 0, \Delta_{\text{mix}}V = 0$

B. A mixture of phenol and aniline shows negative deviation in its vapour pressure

C. A mixture of carbondisulphide and acetone shows positive deviation in its vapour pressure

D. Nitric acid and water mixture shows large positive deviation in its vapour pressure and forms minimum boiling point azeotrope

Answer: D

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67. Which of the following statements are correct

(a) the boiling point of a solution is greater than pure solvent

(b) the temperature where the vapour pressure of liquid equals to atmospheric pressure is called its boiling point

(c) the vapour pressure of pure solvent is less than the vapour pressure of solution containing non volatile solute.

(d) the temperature of liquid remained in the container after evaporation is more than before the evaparation

A. a,b

B. b,c

C. c,d

D. a,d

Answer: A

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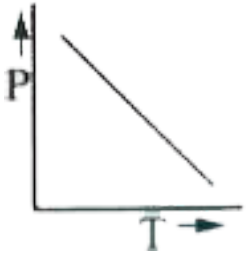
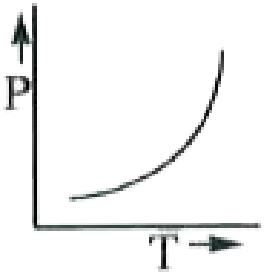
68. The graph obtained by taking vapour pressure (P) of a liquid on y-axis and temperature (T) on x-axis will be

A.

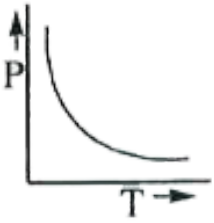
B.



C.



D.



Answer: C

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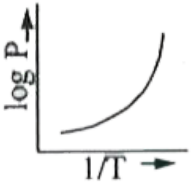
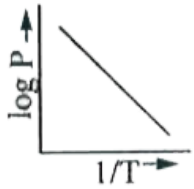
69. Which graph of the following represents the graph between log p (on Y - axis) and 1/T (on X - axis)?

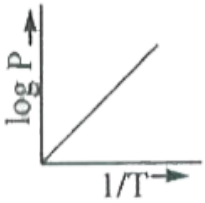
A.



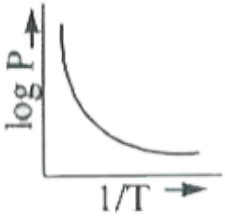
B.



C.



D.



Answer: B

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70. Which of the following solutions will have the lowest vapour pressure

A. 0.1M Glucose

B. 0.1M NaCl

C. 0.1 M $BaCl_2$

D. 0.1 m $Al_2(SO_4)_3$

Answer: D

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71. 6 g of urea is dissolved in 90g of boiling water. The vapour pressure of the solution is

A. 744.8 mm

B. 758 mm

C. 761 mm

D. 760 mm

Answer: A

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72. At a given temperature

(a) Vapour pressure of a solution containing nonvolatile solute is proportional to mole fraction of solvent

(b) Lowering of vapour pressure of solution containing nonvolatile solute is proportional to mole fraction of solute

(c) Relative lowering of vapour pressure is equal to mole fraction of solute

A. a only

B. a,b only

C. a,b and c only

D. b,c only

Answer: C

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73. As temperature increases, vapour pressure of a liquid

A. increases linearly

B. decreases linearly

C. increases exponentially

D. decreases exponentially

Answer: C

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74. Statement-1: Acetone + Carbon disulphide solution shows positive deviation from Raoult's law

Statement-2 : Acetone + Aniline solution shows positive deviation from Raoult's law

A. Both statement-1 and statement-2- are correct

B. Both statement-1 and statement-2- are wrong

C. Statement-1 is correct and statement-2 is wrong

D. Statement-1 is wrong and statement-2 is correct

Answer: C

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75. Which one of the following is correct for solutions of components of A and B to follow Raoult's law ?

A. A-B attractive force is greater than A-A and B-B attractive forces

B. A-B attractive force is less than A-A and B-B attractive forces

C. A-B attractive force remains same as A-A and B-B attractive forces

D. volume of solution is different from sum of volumes of A and B components

Answer: C

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76. When mercuric iodide is added to the aqueous solution of potassium iodide

A. Freezing point is raised

B. Freezing point is lowered

C. Freezing point does not change

D. Boiling point does not change

Answer: A

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77. The degree of dissociation (α) of a weak electrolyte A_xB_y is related to Van't Hoff factor (i) by the expression

A. $\alpha = \frac{i-1}{(x+y-1)}$

B. $\alpha = \frac{i-1}{x+y+1}$

C. $\alpha = \frac{x+y-1}{i-1}$

D. $\alpha = \frac{x + y + 1}{i - 1}$

Answer: A

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78. Which of the following aqueous solution has the highest boiling point ?

A. 0.1 M KNO_3

B. 0.1 M Na_3PO_4

C. 0.1 M $BaCl_2$

D. 0.1 M K_2SO_4

Answer: B

Watch Video Solution

79. When mercuric iodide is added to the aqueous solution of potassium iodide, the

A. freezing point is raised

B. freezing point does not change

C. freezing point is lowered

D. boiling point does not change

Answer: A

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80. In the depression of freezing point experiment, it is found that

(a) The vapour pressure of the solution is less than that of pure solvent

(b) The vapour pressure of the solution is more than that of pure solvent

(c) Only solute molecules solidify at the freezing point

(d) Only solvent molecules solidify at the freezing point

A. a,b

B. b,c

C. a,d

D. a,b,c

Answer: C

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81. During the depression in freezing point experiment, an equilibrium is established between the molecules of

A. Liquid solvent, Solid solvent

B. Liquid solvent, Solid solute

C. Liquid solute, Solid Solute

D. Liquid solute, Solid solvent

Answer: A

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82. The molal elevation constant is the ratio of the elevation in boliing point to

A. Molarity

B. Molality

C. Mole fraction of solute

D. Mole fraction of solvent.

Answer: B

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83. The relationship between osmotic pressure at 273 K when 10 g glucose (P_1), 10 g urea (P_2) and 10 g sucorse (P_3) are dissoved in 250 ml of water is

A. $P_1 > P_2 > P_3$

B. $P_3 > P_1 > P_2$

C. $P_2 > P_1 > P_3$

D. $P_2 > P_3 > P_1$

Answer: C

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84. Equimolar solutions of electrolytes with different number of ion in the same solvent have

A. Same boiling point but different freezing point

B. Same freezing point but different boiling point

C. Same boiling and same freezing points

D. Different boiling and different freezing point

Answer: D

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85. If α is the degree of dissociation of Na_2SO_4, the Vant Hoff factor (i) used for calculating the molecular mass is

A. $1 + \alpha$

B. $1 - \alpha$

C. $1 + 2\alpha$

D. $1 - 2\alpha$

Answer: C

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86. Solution A contains 7g/L $MgCl_2$ and solution B contains 7g/L of NaCl. At room temperature, the osmotic pressure of

A. Solution A is greater than B

B. Both have same osmotic pressure

C. Solution B is greater than A

D. Can't determine.

Answer: C

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87. Which of the following aqueous solutions containing 10g of solute in each case, has highest melting point?

A. NaCl solution

B. KCl solution

C. Sugar solution

D. Glucose solution

Answer: C

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88. Which of the following salt will have same value of Van't Hoff's factor [i] as that of $K_4\left[Fe(CN)_6\right]$

A. $Al_2(SO_4)_3$

B. NaCl

C. $Al(NO_3)_3$

D. Na_2SO_4

Answer: A

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89. After removing the hard shell of an egg by dissolving in dil. HCl, a semipermeable membrane is visible. If such an egg is kept in a saturated solution of common salt the size of the egg

A. will shrink

B. will grow

C. will remain the same

D. first shrink and then grow larger

Answer: A

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90. In a pressure cooker the cooking is fast because

A. Heat is more evenly distributed

B. The higher pressure tenderizes the food

C. The boiling point of water inside the cooker is elevated

D. The boiling point of water inside the cooker is depressed

Answer: C

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91. The van't Hoff factor for $BaCl_2$ at 0.01 M concentration is 1.98. The percentage dissociation of $BaCl_2$ at this concentration is

A. 49

B. 69

C. 89

D. 98

Answer: A

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92. For a weak monobasic acid, if pK_a = 4, then at a concentration of 0.01 M of the acid solution, the van't Hoff factor is

A. 1.01

B. 1.02

C. 1.10

D. 1.20

Answer: C

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93. The molal freezing point constant of water is 1.86C/M. Therefore the freezing point of 0.1 M NaCl solution in water is expected to be

A. $-1.86^{\circ}C$

B. $-0.186^{\circ}C$

C. $-0.372^{\circ}C$

D. $+0.372^{\circ}C$

Answer: C

View Text Solution

94. A 5% solution of cane suger is isotonic with 0.5% of X. The molecular weight of substance X is

A. 34.2

B. 171.2

C. 68.4

D. 136.8

Answer: C

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95. An aqueous solution freezes at $-0.186^{\circ}C\left(K_f = 1.860, K_b = 0.512^{\circ}\right)$. What is the elevation on boiling point?

A. 0.186

B. 0.512

C. 0.86

D. 0.0512

Answer: D

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96. The properties of solutions which depend only on the number of particles of solute (or the number of moles of solute) but independent of the nature of the solute are called

A. extensive properties

B. intensive properties

C. colloidal properties

D. colligative properties

Answer: D

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97. The solublity of I_2 in KI solution is more than its solubility in pure water because

A. I_2 dissociates in water

B. I_2 does not react with water

C. I_2 forms soluble complex KI_3 with KI

D. None of these

Answer: C

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98. If 0.1M solution of glucose and 0.1M solution of urea are placed on two sides of a semi permeable membrane to equal heights, then it will be correct to say that

A. Glucose will flow towards urea solution

B. There will be no net movement across membrane

C. Urea will flow towards glucose solution

D. Water will flow from urea solution to glucose

Answer: B

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99. The freezing point of equimolal aqueous solution will be highest for

A. $C_6H_5NH_3Cl$

B. $Ca(NO_3)_2$

C. $La(NO_3)_3$

D. $C_6H_{12}O_6$

Answer: D

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100. The relationship between the value of Osmotic pressue (π) of the solution obtained by dissolving 6 g.L^{-1} of acetic acid (π_1) and 7.45 g.L^{-1} of KCl (π_2) is

A. $\pi_1 < \pi_2$

B. $\pi_1 > \pi_2$

C. $\pi_1 = \pi_2$

D. $\frac{\pi_1}{\pi_1 + \pi_2} = \frac{\pi_2}{\pi_1 + \pi_2}$

Answer: A

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101. Solution A, B, C and D are respectively 0.1M Glucose, 0.05M NaCl, 0.05M $BaCl_2$ and 0.1M AlF_3. Which one of the following pairs is isotonic ?

A. A & C

B. B & C

C. A & B

D. A & D

Answer: C

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102. Solution S_1 contains 3g of urea per litre and solution S_2 contains 9g glucose per litre. At 298 K, the osmotic pressure of

A. S_1 is greater than that of S_2

B. S_1 is less than that of S_2

C. Both the solutions is same

D. Both the solutions is 1 atm.

Answer: C

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Set - I	Set - II
i) RBC in 0.5% NaCl solution	A) Swells
ii) RBC in 1% NaCl solution	B) Shrinks
iii) Egg (outer shell removed) in water	
iv) Egg (outer shell removed) in NaCl solution	

103. incorrect match is

A. i-A

B. ii-B

C. iii-A

D. iv-A

Answer: D

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104. The osmotic pressure of a phenol solution in an organic solvent is deternined to be 20% less than expected, it is due to

A. Phenol is 20% ionised

B. Phenol is 20% dimerised

C. Phenol is 40% dimerised

D. Phenol is 80% dimerised

Answer: C

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105. Which of the following is a colligative property

A. vapour pressure of a liquid

B. boiling point

C. freezing point

D. relative lowering of vapour pressure of a solution

Answer: D

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106. $FeCl_3$ on reaction with $K_4\left[Fe(CN)_6\right]$ in aq solution gives blue colour and these are separated by a semi permeable membrane Due to osmosis there is

A. blue colour formation in the solution of $FeCl_3$

B. blue colour formation in the solution of $K_4\left[Fe(CN)_6\right]$

C. blue colour formation in both the solutions

D. no blue colour formation

Answer: D

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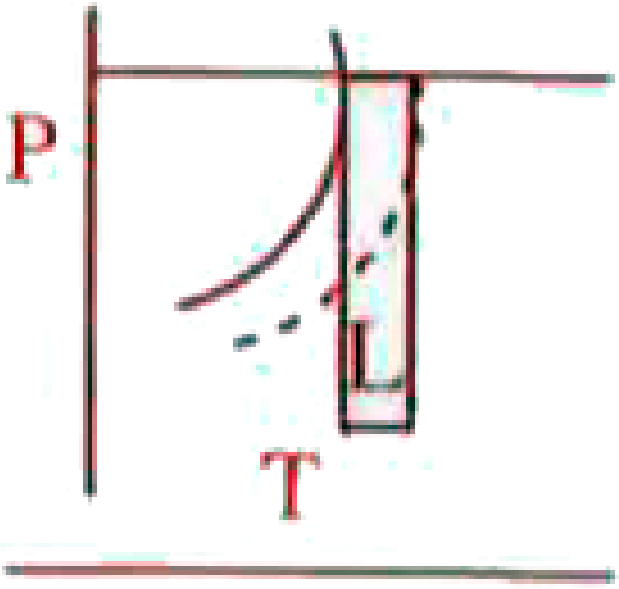
107. The phase diagrams for the pure solvent (solid lines) and the solution (non-volatile solute, dashed line) are recorded below. The

quantity indicated by 'L' in the figure is



A. Δp

B. ΔT_f

C. $K_b . m$

D. $K_f . m$

Answer: C

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108. For a dilute solution, Raoult's law states that:

A. The relative lowering of vapour pressure is equal to the mole fraction of solute.

B. The relative lowering of vapour pressure is equal to the mole fraction of solvent

C. The relative lowering of vapour pressure is proportional to the amount of solute in solution

D. The vapour pressure of the solution is equal to the mole fraction of solvent.

Answer: A

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109. At 300K, the osmotic pressue of 300mL of a protein aqueous solution is 8.3×10^{-5} bar. The molar mass of protein is $10^4 gmol^{-1}$. What is the

weight (in g) of the protein present in this solution ? (R=0.083 L bar $\mathrm{mol}^{-1}K^{-1}$)

A. 0.1

B. 1.0

C. 10

D. 0.01

Answer: D

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110. A 5% by mass of an aqueous solution of A of molar mass $342\mathrm{gmol}^{-1}$ is isotonic with 0.878% by mass of an aqueous solution of another substance B. The molar mass of B in gmol^{-1} is

A. 120

B. 180

C. 60

D. 90

Answer: C

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111. Which of the following liquid pairs shows a positive deviation from Raoults Law ?

A. $H_2O - HCl$

B. $C_6H_6 - CH_3OH$

C. $H_2O - HNO_3$

D. $CH_3COCH_3 - CHCl_3$

Answer: B

Watch Video Solution

112. The Vant Hoff's factor 'i' accounts for

A. extent of solubility of solute

B. extent of mobility of solute

C. extent of dissolution of solute

D. extent of dissociation of solute

Answer: D

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113. Isotonic solutions are solutions having the same

A. Surface tension

B. Vapour pressure

C. Osmotic pressure

D. Viscosity

Answer: C

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114. How many grams of sucrose should be dissolved in 100g water in order to produce a solution having difference between the free zing point and the boiling point temperatures at $105.0^{\circ} C$

A. 34.2

B. 72

C. 342

D. 460

Answer: B

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115. The ratio of any colligative property for KCl solution to that of sugar solution of same molality is

A. 1

B. 0.5

C. 2

D. 3

Answer: C

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Objective Exercise 2

1. The number of Glucose molecules present in 10 ml of decimolar solution is

A. 6.0×10^{20}

B. 6.0×10^{19}

C. 6.0×10^{21}

D. 6.0×10^{22}

Answer: A

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2. The number of ions present in 1 ml of $0.1MCaCl_2$ solution is

A. 1.8×10^{20}

B. 6.0×10^{20}

C. 1.8×10^{19}

D. 1.8×10^{21}

Answer: A

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3. 100 ml of an aqueous solution contains 6.023×10^{21} solute molecules. The solution is diluted to 1 lit. The number of solute molecules present in 10ml of the dilute solution is

A. 6.0×10^{20}

B. 6.0×10^{19}

C. 6.0×10^{18}

D. 6.0×10^{17}

Answer: B

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4. 11.1g. Of $CaCl_2$ is present in 100 ml of the aqueous solution. The chloride ion concentration is

A. 1M

B. 2M

C. 0.5M

D. 0.2M

Answer: B

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5. 100 ml each of 1M $AgNO_3$ and 1M NaCl are mixed. The nitrate ion concentration in the resulting solution is

A. 1 m

B. 0.5 M

C. 0.75 M

D. 0.25 M

Answer: B

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6. H_2SO_4 is labelled as 9.8% by weight. Specific gravity of H_2SO_4 is 1.8. The volume of the acid to be taken to prepare 1000 ml of 0.18M solution is

A. 10 ml

B. 100 ml

C. 740 ml

D. 360 ml

Answer: B

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7. HCI is labelled as 3.65% (w/v) 10ml of the solution is diluted to 1 lit. The proton concentration in the resulting solution is

A. 10^{-3} M

B. 2.5×10^{-2} M

C. 7.5×10^{-2} M

D. 10^{-2} M

Answer: D

Watch Video Solution

8. 100 ml of 1M HCl, 200 ml 2 M HCl and 300 ml 3M HCl are mixed. The Molarity of the resulting solution is

A. 1M

B. 2.66M

C. 2.33 M

D. 4.25 M

Answer: C

Watch Video Solution

9. The volumes of 1M HCl and 5M HCl to be mixed to get 2 lit of 2M HCl are

A. 1 lit and 1 lit

B. 1.5 lit and 0.5 lit

C. 1.25 lit and 0.75 lit

D. 1.33 lit and 0.06 lit

Answer: B

Watch Video Solution

10. A 20% (W/W) solution of NaOH is 5 M. The dens of the solution is

A. $1 \mathrm{g.ml}^{-1}$

B. $2 \mathrm{g.ml}^{-1}$

C. $0.5 \mathrm{g.ml}^{-1}$

D. $0.25 \mathrm{g.ml}^{-1}$

Answer: A

Watch Video Solution

11. Zinc reacts with $CuSO_4$ according to the equation $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$. If excess of zinc is added to 100ml of 0.05M $CuSO_4$, the amount of copper formed

A. 0.6354 g

B. 0.3177 g

C. 3.177 g

D. 6.354 g

Answer: B

Watch Video Solution

12. 10.6 g of a substance of molecular weight 106 was dissolved in 100 ml 10 ml of this solution was pipetted out into a 1000 ml flask and made up to the mark with distilled water. The molarity of the resulting solution is

A. 1M

B. 10^{-2} M

C. 10^{-3}

D. 10^{-4} M

Answer: B

Watch Video Solution

13. 100 ml of 1M HCl, 200 ml of 2M HCl and 300 ml of 3M HCl are mixed with enough water to get 1M solution. The volume of water to be added is (in ml)

A. 600

B. 700

C. 800

D. 125

Answer: C

Watch Video Solution

14. The concentration of a 100 ml solution containing xg of Na_2CO_3 (molecular wt=106) is YM.The value of X and Y are respectively

A. 2.12 , 0.05

B. 1.06 , 0.2

C. 1.06 , 0.1

D. 2.12 , 0.1

Answer: C

Watch Video Solution

15. 3.92 g. of Mohr salt [mol. wt = 392] is present in 100 ml of an aqueous solution. The sulphate ion concentration of the resulting solution is

A. 1M

B. 2M

C. 0.2M

D. 0.02 M

Answer: C

Watch Video Solution

16. The volume of 0.05N Na_2CO_3 solution required to neutralise 200ml of 0.02M H_2SO_4 solution is

A. 80 ml

B. 140 ml

C. 160 ml

D. 240 ml

Answer: C

Watch Video Solution

17. 200 ml of 1M H_2SO_4, 300 ml 3M HCl and 100 ml of 2M HCI are mixed and made up to 1 litre. The proton concentration in the resulting solution is

A. 1.25 M

B. 1.5 M

C. 2.5 M

D. 0.75 M

Answer: B

Watch Video Solution

18. The volume of 0.025M $Ca(OH)_2$ solution which can neutralise 100 ml of 10^{-4} M H_3PO_4 is

A. 10 ml

B. 60 ml

C. 0.6 ml

D. 2.8 ml

Answer: C

Watch Video Solution

19. The Molarity of 200 ml of HCl solution which can neutralise 10.6 g. of anhydrous Na_2CO_3 is

A. 0.1 M

B. 1M

C. 0.6M

D. 0.75M

Answer: B

Watch Video Solution

20. 0.84 g. of an acid of Molecular weight 225 is present in 100ml of the solution. 25ml of this solution required 28ml of N/10 NaOH solution for complete neutralisation. The basicity of the acid is

A. 1

B. 2

C. 3

D. 4

Answer: C

Watch Video Solution

21. 10 millimoles of a diacidic base exactly neutralises 100ml of an acid. Then the Normality of that acid is

A. 0.2 N

B. 0.1 N

C. 0.4 N

D. 0.5 N

Answer: A

Watch Video Solution

22. 100 ml of 0.1N $FeSO_4$ solution will be completely oxidised by 'x' gms of $K_2Cr_2O_7$ in acidic medium (Mol.wt = 294). The value of 'x' is

A. 4.9

B. 2.94

C. 0.49

D. 1.47

Answer: C

Watch Video Solution

23. 100 ml of 2M HCl solution completely neutralises 10 g, of a metal carbonate. Then the equivalent weight of the metal is

A. 50

B. 20

C. 12

D. 100

Answer: B

Watch Video Solution

24. What is the volume (in ml) of 0.1 M potasium permanganate solution required to completely oxidise 100 ml of 0.5 M ferrous sulphate solution in acidic medium?

A. 20

B. 200

C. 50

D. 100

Answer: D

Watch Video Solution

25. The Normality of 0.98% (w/v) H_2SO_4 solution is

A. 0.1 N

B. 0.2 N

C. 0.4 N

D. 1N

Answer: B

Watch Video Solution

26. Molarity of 3N H_3PO_4 solution is

A. 9 M

B. 1.5 M

C. 6 M

D. 1 M

Answer: D

Watch Video Solution

27. To convert 12 g of NaH_2PO_4 completely into Na_3PO_4, the volume of 1 molar NaOH required is

A. 200cm^3

B. 100cm^3

C. 80cm^3

D. 120cm^3

Answer: A

Watch Video Solution

28. The weight of $KMnO_4$ that can oxidise 100ml of. 0.2M oxalic acid in acidic medium is [Mol. wt of $KMnO_4$ = 158]

A. 1.58 g

B. 1.264 g

C. 12.64 g

D. 15.8 g

Answer: B

Watch Video Solution

29. A tablet of vitamin 'C' is analysed for its ascorbic acid content. One tablet reacts exactly with 20ml of 0.1 N NaOH solution. The equivalent weight of ascorbic acid is 176. The tablet contains _____ mg of ascorbic acid

A. 0.352

B. 3.52

C. 35.2

D. 352

Answer: D

Watch Video Solution

30. On dissolving 1 mole of each the following acids, in 1 litre water, the acid which does not give a solution of strength 1N

A. Hydrochloric acid

B. Perchloric acid

C. Nitric acid

D. Phosphoric acid

Answer: D

Watch Video Solution

31. The number of moles of $KMnO_4$ that will be needed to react completely with one mole of ferrous oxalate in acidic solution is

A. $3/5$

B. $2/5$

C. $4/5$

D. 1

Answer: A

Watch Video Solution

32. An aqueous solution of 6.3g oxalic acid dihydrate is made upto 250 ml. the volume of 0.1 N NaOH required to completely neutralise 10 ml of this solution is

A. 40 ml

B. 20 ml

C. 10ml

D. 4 ml

Answer: A

Watch Video Solution

LIST - 1	LIST - 2
A) 0.5M H_2SO_4 solution	1) 0.1N solution
B) 0.1M NaCl solution	2) 1N solution
C) 0.2M $AlCl_3$ solution	3) 1.5N solution
D) 0.5M H_3PO_4 solution	4) 2.0N solution
	5) 0.6N solution

33.

A. A-2,B-5,C-1,D-3

B. A-4,B-2,C-1,D-5

C. A-2,B-1,C-5,D-3

D. A-5,B-4,C-2,D-1

Answer: C

Watch Video Solution

34. The molality of 2% (W/W) NaCl solution nearly

A. 0.02 m

B. 0.35 m

C. 0.25 m

D. 0.45 m

Answer: B

Watch Video Solution

35. 100 ml of ethyl alcohol [d = 0.92 g/ml] and 900 ml of water [d = 1 g/ml] are mixed to form 1 lit solution. The Molarity and molality of the resulting solution are

A. 2M and 2m

B. 2M and 2.22 m

C. 2.2 M and 1.1 m

D. 2M and 1 m

Answer: B

Watch Video Solution

36. Which of the following aqueous solutions is more concentrated [Assume the density of the solution as 1g/ml]

A. 1M Glucose

B. 1m Glucose

C. 0.5 m Glucose

D. 0.5 M Glucose

Answer: A

Watch Video Solution

37. Density of 2.05M solution of acetic acid in water is 1.02 g/mL, the molality of that solution is

A. 2.3

B. 0.49

C. 0.06

D. 0.43

Answer: A

Watch Video Solution

38. Which of the following solution is more concentrated

A. 0.3% H_3PO_4

B. 0.3 M H_3PO_4

C. 0.3m H_3PO_4

D. 0.3 N H_3PO_4

Answer: B

Watch Video Solution

39. Molarity of 1m aqueous NaOH solution [density of the solution is 1.02 g/ml]

A. 1M

B. 1.02 M

C. 1.2 M

D. 0.98 M

Answer: D

Watch Video Solution

40. A gaseous mixture contain four gases A, B, C and D. The mole fraction of "B" is 0.5. The mole fraction of "A" is

A. 0.525

B. 0.375

C. 0.625

D. 0.732

Answer: B

Watch Video Solution

41. Aqueous NaOH solution is labelled as 10% by weight mole fraction of the solute in it is

A. 0.05

B. 0.0476

C. 0.052

D. 0.52

Answer: B

Watch Video Solution

42. The mole percentage of oxygen in a mixture of 7.0 g of nitrogen and 8.0 g of oxygen is

A. 8

B. 16

C. 21

D. 50

Answer: D

Watch Video Solution

43. The mole fraction of solvent in 0.1 molal aqueous solution is

A. 0.9982

B. 0.0017

C. 0.017

D. 0.17

Answer: A

Watch Video Solution

44. NaOH aqueous solution is labelled as 10% (w/v). Density of the solution is 1.02 g/ml. Then the mole fraction of the solute in the solution is

A. 0.05

B. 0.0466

C. 0.53

D. 0.053

Answer: B

Watch Video Solution

45. A solution has 1:4 molar ratio of pentane and hexane. The vapour pressure of pure hydro-carbons at $20^{\circ}C$ are 440 mm Hg for pentane and 120 mm of Hg for hexane. The mole fraction of pentane in vapour phase would be

A. 0.200

B. 0.478

C. 0.547

D. 0.786

Answer: B

Watch Video Solution

46. O_2 is bubbled through water at 293K, assuming that O_2 exerts a partial pressure of 0.98 bar, the solubility of O_2 in gm.L^{-1} is (Henry's law constant = 34 k bar)

A. 0.025

B. 0.05

C. 0.1

D. 0.2

Answer: B

Watch Video Solution

47. H_2S a toxic gas with rottenegg like smell is used for the qualetative analysis, if the solubility of H_2S in water, at STP is 0.195 mole. kg^{-1} the Henry's law constant is

A. 285.6 bar

B. 324.8 bar

C. 462.9 bar

D. 534.8 bar

Answer: A

Watch Video Solution

48. Air contains O_2 and N_2 in the ratio 0.2 : 0.8. If Henry law constant for O_2 and N_2 are 3.3×10^7 torr and 6.6×10^7 torr respectively, then the ratio of mole fractions of O_2 to N_2 dissolved in water at 1 bar pressure is

A. $1:1$

B. $2:1$

C. $1:2$

D. $1:3$

Answer: C

Watch Video Solution

49. The quantity of CO_2 in 500ml of soda water when packed under 2.5 atm CO_2 pressure at 298 k is..... gm (Henry's law constant 1.67×10^8 pa at 298K)

A. 0.64

B. 1.86

C. 6.4

D. 18.6

Answer: B

Watch Video Solution

50. Henry's law constant for the molality of methane in benzene at 298 K is 4.27×10^5 mm Hg . Calculate the solubility of methane in benzene at 298 K under 760 mm Hg.

A. 7.8×10^{-2} mole/kg

B. 7.8×10^{-3} mole/kg

C. 7.8×10^{-4} mole/kg

D. 1.78×10^{-3} mole/kg

Answer: D

Watch Video Solution

51. 6 g. of a non volatile solute is dissolved in 90g. of water, such that the lowering in vapour pressure is 2%. The molecular weight of the solute is

A. 65

B. 92

C. 60

D. 80

Answer: C

Watch Video Solution

52. The vapour pressure of water at $20^{\circ} C$ is 17.54mm Hg. then the vapour pressure of the water in the apparatus shown after the piston is lowered, decreasing the volume of the gas above the liquid to one half of its initial volume (temp. constant) is

A. 8.77 mm Hg

B. 17.54 mm Hg

C. 35.08 mm Hg

D. between 8.77 and 17.54 mmHg

Answer: B

Watch Video Solution

53. An aq. solution containing 64% by weight of volatile liquid 'A' (molecular mass 128) has pressure of 145mm, then vapour pressure of 'A' is (V.P. of H_2O is 155 mm)

A. 150 mm

B. 145 mm

C. 105 mm

D. 21 mm

Answer: C

Watch Video Solution

54. The weight of urea to be dissolved in 100 g. of water to decrease the vapour pressure of water by 5% is

A. 20 g.

B. 14.66 g

C. 15.24 g

D. 16.66 g

Answer: D

Watch Video Solution

55. 139.18 g of glucose is added to 178.2 g of water the vapour pressure of water for this aqueous solution at $100^{\circ} C$ is

A. 704 torr

B. 759 torr

C. 7.6 torr

D. 76 torr

Answer: A

Watch Video Solution

56. The relative lowering of vapour pressure of 0.2 molal solution in which the solvent is Benzene is

A. 15.6×10^{-4}

B. 15.6×10^{-3}

C. 15.6×10^{-1}

D. 0.05

Answer: B

Watch Video Solution

57. Vapour pressure of an aqueous solution is 2% less than that of the solvent. The molality of the solution is

A. 2m

B. 1.5 m

C. 1.13 m

D. 0.2 m

Answer: C

Watch Video Solution

58. The amount of Glucose to be dissolved in 500g of water so as to produce the same lowering in vapour pressure as that of 0.2 molal aqueous urea solution

A. 9 g

B. 18 g

C. 36 g

D. 1.8 g

Answer: B

Watch Video Solution

59. A Current of dry air was first passed through the bulb containing solution of 'A' in water and then through the bulb containing pure water. The loss in mass of a solution bulb is 1.92g gm. Where as that in pure water bulb is 0.08g, then mole fraction of 'A' is.

A. 0.86

B. 0.2

C. 0.96

D. 0.04

Answer: D

Watch Video Solution

60. At $20^\circ C$, the vapour pressure of diethyl ether is 442mm. When 6.4g. of a non-volatile solute is dissolved in 50g. of ether, the vapour pressure falls to 410mm. The Molecular weight of the solute is

A. 150

B. 130.832

C. 160

D. 180

Answer: B

Watch Video Solution

61. The vapour pressure of pure water at $25^\circ C$ is 30 mm. The vapour pressure of 10% (W/W) glucose solution at $25^\circ C$ is

A. 31.5 mm

B. 30.6 mm

C. 29.67 mm

D. 26.56 mm

Answer: C

Watch Video Solution

62. The vapour pressure of a pure liquid 'A' is 60mm, at $25^\circ C$. It forms an ideal solution with another liquid 'B'. The mole fraction of 'B' is 0.6 and

the total Pressure is 64mm. Then the vapour pressure of 'B' at $25^{\circ}C$ is

A. 66.6 mm

B. 75 mm

C. 52 mm

D. 120 mm

Answer: A

Watch Video Solution

63. Two liquids A and B form an Ideal solution. At 300K, the V.P of solution containing one mole of 'A' and 4 mole 'B' is 560mm Hg. At the same temp. If one mole of 'B' is taken out from the solution the V.P of the solution has decreased by 10mm Hg, the V.P, of pure A & B are (in min)

A. 400600

B. 500500

C. 300700

D. 200800

Answer: A

Watch Video Solution

64. At certain temperature, the solution of benzene in toulene exihibits the vapour pressure (in m bar) representes as P= 150x + 65, where 'x' is mole fraction of benzene, the vepour pressure of pure benzene is

A. 150 m bar

B. 65 m bar

C. 90 m bar

D. 215 m bar

Answer: D

Watch Video Solution

65. A solute has 2:3 molar ratio of toulene to benzene. The vapour pressure of benzene and toulene at $25^{\circ}C$ are 95 and 28 bar respectively. The mole fraction of Toulene vapour is

A. 0.658

B. 0.326

C. 0.548

D. 0.855

Answer: C

Watch Video Solution

66. If 2 moles of A and 3 moles of B are mixed to form an ideal solution vapour pressure of A and B are 120 and 180 mm of Hg respectively, then the composition of A and B in the Vapour phase when the first traces of vapour are formed in the above case is

A. $X|A$=0.407

B. $X_A = 0.8$

C. $X_A = 0.109$

D. $X_A = 0.307$

Answer: D

Watch Video Solution

67. The vapour pressure of a solvent decreased by 10 mm of mercury, when a non-volalite solute was added to the solvent. The mole fraction of the solute in the solution is 0.2. What should be the mole fraction of the solvent, if the decrease in the vapour pressure is to be 20 mm of mercury ?

A. 0.2

B. 0.4

C. 0.6

D. 0.8

Answer: C

Watch Video Solution

68. The vapour pressure of pure benzene is 640 mm at 298K. A solution of a solute in benzene shows a vapour pressure of 630 mm at the same temperature. Then the mole fraction of the solute is

A. 0.016

B. 0.18

C. 0.20

D. 0.25

Answer: A

Watch Video Solution

69. The vapour pressure of water at room temperature is 23.8 mm Hg. The vapour pressure of an aqueous solution of sucrose with mole fraction 0.1 is equal to :

A. 23.9 mm Hg

B. 24.2 mm Hg

C. 21.42 mm Hg

D. 31.44 mm Hg

Answer: C

Watch Video Solution

70. The vapour pressure of pure A is 10 torr and at the same temperature when 1g of B is dissolved in 20 g of A, its vapour pressure is reduced to 9.0 torr. If the molecular mass of A is 200 amu, then the molecular mass of B is

A. 100 amu

B. 90 amu

C. 75 amu

D. 120 amu

Answer: B

View Text Solution

71. The percentage composition by weight of an aqueous solution of a solute (molecule mass 150) which boils at 373.26 is

A. 5

B. 15

C. 7

D. 10

Answer: C

Watch Video Solution

72. Molality of an aqueous solution that produces an elevation of boiling point of 1.00K at 1 atm pressure $\left(K_b \text{ for water } = 0.512K.\ kg.\quad \text{mol}^{-1}\right)$

A. 0.512 M

B. 0.195 m

C. 1.95 m

D. 5.12 M

Answer: C

Watch Video Solution

73. The molal elevation constant of water is 0.51. The boiling point of 0.1 molal aqueous NaCl solution is nearly:

A. $100.05^\circ C$

B. $100.1^{\circ} C$

C. $100.2^{\circ} C$

D. $101.0^{\circ} C$

Answer: A

Watch Video Solution

74. Ebullioscopy is concerned with:

A. Osmotic pressure of a solution

B. Elevation of boiling point of a solution

C. Depression in freezing point of a solution

D. Relative lowering in vapour pressure of a solution

Answer: B

Watch Video Solution

75. An aqueous solution containing one gram of urea boils at $100.25^{\circ}C$. The aqueous solution containing 3gm of glucose in the same volume will boil at

A. 100^{C}

B. $100.25^{\circ}C$

C. $100.5^{\circ}C$

D. $100.75^{\circ}C$

Answer: B

Watch Video Solution

76. A solution prepared by dissolving 0.8gm of naphthalene in 100g of CCl_4 has a boiling point elevation of $0.4^{\circ}C$. A 1.24 g of an un known solute in same amount of CCl_4 produced boiling point elevation of $0.62^{\circ}C$, then molar mass of un-known solute is

A. 25g

B. 50g

C. 75g

D. 128g

Answer: D

Watch Video Solution

77. A solution containing 3.3g of a substance in 125g of benzene (b.pt. = $80^\circ C$) boils at $80.66^\circ C$. If K_b for benzene is 3.28 K kg mol l^{-1} the molecular mass of the substance will be:

A. 130.20

B. 129.20

C. 132.20

D. 131.20

Answer: D

Watch Video Solution

78. An aqueous solution freezes at $-0.372^{\circ}C$. If K_f and K_b for water are 1.86K kg mol^{-1} and 0.53 K kg mol^{-1} respectively, the elevation in boiling point of same solution in K is:

A. 0.72

B. 0.46

C. 4.6

D. 0.106

Answer: D

Watch Video Solution

79. Which of the following aqueous solutions should have the highest boiling point ?

A. 1.0M NaOH

B. 1.0M Na_2SO_4

C. 1.0 M NH_4NO_3

D. 1.0 M KNO_3

Answer: B

Watch Video Solution

80. The depression in freezing point of 0.01 m aqueous solution of urea, sodium chloride and sodium sulphate is in the ratio

A. $1:1:1$

B. $1:2:3$

C. $1:2:4$

D. $2:2:3$

Answer: B

Watch Video Solution

81. Molal depression constant is given by the expression:

A. $\Delta T_f \times m$

B. $\Delta T_f \times M$

C. $\frac{\Delta T_f}{M}$

D. $\frac{\Delta T_f}{m}$

Answer: D

Watch Video Solution

82. To 500cm^3 of water. 3.0×10^{-3} kg of acetic acid is added. If 23% of acetic acid is dissociated, what will be the depression in freezing point. If k_f and density of water are 1.86 k kg^{-1} and 0.997 gcm^{-3} respectively

A. 0.186 k

B. 0.228 k

C. 0.372 k

D. 0.556 k

Answer: B

View Text Solution

83. 'x' gm of solute (M. mass = 342) should be dissolved in 500gm of water so as to get a solution having difference of $105^\circ C$ between freezing point and boiling point, then 'x' is

A. 159

B. 259

C. 359

D. 459

Answer: C

Watch Video Solution

84. The amount of ice that will separate out on cooling the solution containing 50g of ethylene glycol $(CH_2OH)_2$ in 200 g of water at $-9.3^\circ C$ is

A. 276 g

B. 188 g

C. 138 g

D. 38.71 g

Answer: D

Watch Video Solution

85. A Solution of a non-volatile solute in water freezes at $-0.30^{\circ}C$. The vapour-pressure of pure water at 298K is 23.51 mm Hg and K_f for water is 1.86 K. kg mol^{-1} Calculate the vapour-pressure of this solution at 298K.

A. 23.4 mm

B. 24.8 mm

C. 34.8 mm

D. 40 mm

Answer: A

View Text Solution

86. The molal freezing point constant for water is 1.86 K.kg mole^{-1}. The freezing point of 0.1m NaCl solution is

A. $-1.86^\circ C$

B. $-0.372^\circ C$

C. $-0.186^\circ C$

D. $0.372^\circ C$

Answer: B

View Text Solution

87. The solution containing 6.8g of non-ionic solute in 100g of water was found to freeze at $-0.93^\circ C$. If K_f for water is 1.86, the molar Mass of solute is

A. 13.6

B. 68

C. 34

D. 136

Answer: D

Watch Video Solution

88. Which of the following aqueous solution has highest freezing point ?

A. 0.1 molal $Al_2(SO_4)_3$

B. 0.1 molal $BaCl_2$

C. 0.1 molal $AlCl_3$

D. 0.1 molal NH_4Cl

Answer: D

View Text Solution

89. Molal depression constant for water is 1.86 K.Kg.mole^{-1}. The freezing point of a 0.05 molal solution of a non electrolyte in water is

A. $-1.86^{\circ}C$

B. $-0.93^{\circ}C$

C. $-0.093^{\circ}C$

D. $0.93^{\circ}C$

Answer: C

Watch Video Solution

90. If the osmatic pressure of human blood is 7.53 atm at $37^{\circ}C$. Calculate the concentration non electrolytic solutes in the blood ?

A. 0.296 mol L^{-1}

B. 0.592 mol L^{-1}

C. 1.12 mol L^{-1}

D. 1 mol L^{-1}

Answer: A

Watch Video Solution

91. Two solutions of glucose have osmotic pressures 1.5 and 2.5 atm. IL of first is mixed with 2L of second solution, the osmotic pressure of the resultant solution is

A. 2.5+1.5 atm

B. 2.5-1.5 atm

C. $\frac{2.5+1.5}{2}$ atm

D. 2.16 atm

Answer: D

Watch Video Solution

92. A 5.25% solutions of a substance is isotonic with 1.5% solution of urea in the same solvent. If the densities of both the solutions are assumed to be equal to lg cm the molar mass of the substance will be

A. 115 $\mathrm{g\ mol^{-1}}$

B. 105 $\mathrm{g\ mol^{-1}}$

C. 210 $\mathrm{mol^{-1}}$

D. 90 $\mathrm{g\ mol^{-1}}$

Answer: C

Watch Video Solution

93. 0.004M Na_2SO_4 is isotonic with 0.01M glucose. Degree of dissociation of Na_2SO_4 is :

A. 50 %

B. 25 %

C. 75 %

D. 85 %

Answer: C

Watch Video Solution

94. The osmotic pressure of the solution obtained by mixing 200cm^3 of 2% (mass-volume) solution of urea with 200cm^3 of 3.42% solution of sucrose at $20^\circ C$ is

A. 4 bar

B. 1.2 bar

C. 5.2 bar

D. 2.60 bar

Answer: C

Watch Video Solution

95. A 5% solution of cane suger is isotonic with 0.5% of X. The molecular weight of substance X is

A. 34.2

B. 119.96

C. 95.58

D. 126.98

Answer: A

Watch Video Solution

96. The Van't Hoff factor for 0.1 M $Ba(NO_3)_2$ solution is 2.74. The degree of dissociation is

A. $91.3\ \%$

B. $87\ \%$

C. $100\ \%$

D. $74\ \%$

Answer: B

View Text Solution

97. If $BaCl_2$ ionizes to an extent of 80% in aqueous solution,the value of van't Hoff factor is

A. 2.6

B. 0.4

C. 0.8

D. 2.4

Answer: A

Watch Video Solution

98. A decimolar solution of $K_4\left[Fe(CN)_6\right]$ at 300K is 50% dissociated, then, osmotic pressure of the solution is

A. 3.61 atm

B. 7.38 atm

C. 12.32 atm

D. 21.34 atm

Answer: B

Watch Video Solution

99. A solution containing 25.6gm of sulphur dissolved in 1000gm of naphthalene gave a freezing point lowering of 0.680, then molecular formula of sulphur is (K_F for naphthalene 6.8K kg mol^{-1})

A. S_2

B. S_4

C. S_6

D. S_8

Answer: D

View Text Solution

100. van't Hoff factor of a 0.5% (w/w) aqueous solution of KCl which freezes at $-0.24^{\circ}C$ is (K_f of water = 1.86K kgmol^{-1}, mol.wt.of KCl =74.5)

A. 1.52

B. 2.32

C. 1.92

D. 1.32

Answer: C

Watch Video Solution

101. The Osmotic pressure of solution containing 4.0g of solute (molar mass 246) per litre at $27^{\circ}C$ is (R = 0.082L atm $\mathrm{k}^{-1}\mathrm{mol}^{-1}$)

A. 0.1 atm

B. 0.2 atm

C. 0.4 atm

D. 0.8 atm

Answer: C

Watch Video Solution

102. Average osmotic pressure of human blood is 7.4 atm at $27^{\circ}C$, then total concentration of various solutes is

A. 0.1 molL^{-1}

B. 0.2 molL^{-1}

C. 0.3 molL^{-1}

D. 0.4 molL^{-1}

Answer: C

Watch Video Solution

103. At $10^{\circ}C$, the osmotic pressure of urea solution was formed to be 500 mm. The solution is diluted 'x' times and the temperature raised to $25^{\circ}C$ when the osmotic prssure was noticed to be 105.3mm, then 'x' is

A. 3

B. 4

C. 5

D. 12

Answer: D

Watch Video Solution

104. 18 g glucose and 6 g urea are dissolved in 1L of solution at $27^{\circ}C$, the osmotic pressure in atm of the solution will be

A. 1.9

B. 2.9

C. 3.9

D. 4.9

Answer: C

Watch Video Solution

105. The osmotic pressure of blood is 7.40 atm. at $27^{\circ} C$. Number of mole of glucose to be used per liter for an intravenous injection that is to have the same osmotic pressure as blood is

A. 0.2

B. 0.1

C. 0.3

D. 0.4

Answer: C

Watch Video Solution

106. The osmotic pressure of 5% aqueous solution of sugar (mol. Mass 342) at $15^{\circ}C$ is

A. 4 atm

B. 3.45 atm

C. 3.75 atm

D. 2.45 atm

Answer: B

Watch Video Solution

107. At 273K, $100\mathrm{Cm}^3$ of a solution containing 3gm of an unidentified solute exhibits an osmotic pressure of 2.24 atm, then molar mass of the solute is

A. 88 gmol^{-1}

B. 188 gmol^{-1}

C. 300 gmol^{-1}

D. 388 gmol^{-1}

Answer: C

View Text Solution

108. Van't Hoff's factor for 0.01M aqueous solution acetic acid is 1.04, the pH of that solution is

A. 3.4

B. 6.4

C. 9.6

D. 10.6

Answer: A

View Text Solution

109. An isotonic solution will produce an osmotic pressure of 10.00 atm measured against pure water at $37^{\circ} C$. How many grams of NaCl must be dissolved in one litre of water to produce at isotonic solution

A. 11.46 g

B. 0.196 g

C. 9.01 g

D. 10 g

Answer: A

Watch Video Solution

110. If the degree of association is 70% for the reaction 2A $\Leftrightarrow (A)_2$ athe van't Hoff factor for the solute 'A' is

A. 0.30

B. 0.70

C. 0.35

D. 0.65

Answer: C

View Text Solution

Objective Exercise 3 Previous Neeet Aipmt

1. A solution has a 1 : 4 mole ratio of pentane to hexane. The vapour pressures of pure hydrocarbons at $20^{\circ} C$ are 440 mm Hg for pentane and 120 mm Hg for hexane. The mole fraction of pentane in vapour phase woule be

A. 0.786

B. 0.478

C. 0.549

D. 0.200

Answer: B

View Text Solution

2. A solution of urea (molar mass 56) boils at $100.18^\circ C$ at atmospheric pressure. If K_f and K_g for water are 1.86 and 0.512 K molality^{-1} respectively, the above solution will freeze at

A. $-6.54^\circ C$

B. $6.54^\circ C$

C. $-0.654^\circ C$

D. $0.654^\circ C$

Answer: C

Watch Video Solution

3. During osmosis, net flow of water through a semipermeable membrane is

A. from both sides of semipermeable membrane with unequal flow rates

B. from solution having lower concentration only

C. from solution having higher concentration only

D. from both sides of semipermeable menbrane with equal flow rates

Answer: B

Watch Video Solution

4. The vapour pressure of two liquids P and Q are 80 torr and 60 torr respectively. The total vapour pressure obtained by mixing 3 mole of P and 2 mole of Q would be

A. 68 torr

B. 20 torr

C. 140 torr

D. 72 torr

Answer: D

Watch Video Solution

5. A solution containing 10 g per dm^3 of urea (molar mass = 60) is isotonic with a 5% (mass by vol.) solution of a non-volatile solute. The molar mass (in g mol^{-1}) of non-volatile solute is

A. 350

B. 300

C. 250

D. 200

Answer: B

Watch Video Solution

6. 1.0 g of a non-electrolyte solute (molar mass 250 g mol^{-1}) was dissolved in 51.2 g of benzene. If the freezing point depression constant of benzene is 5.12 K kg mol^{-1}, the lowering in freezing point will be

A. 0.5 K

B. 0.4 K

C. 0.2 K

D. 0.3 K

Answer: B

Watch Video Solution

7. A 0.5 molal aqueous solution of a weak acid (HX) is 20 percent ionized. The lowering in freezing point of this solution is (K_f = 1.86 K/m for water)

A. 1.12 K

B. -0.56

C. 0.56 K

D. -1.12 K

Answer: A

Watch Video Solution

8. A 0.0020 m aqueous solution in an ionic compound $Co(NH_3)_5(NO_2)Cl$ freezes at $-0.00732^\circ C$. Number of moles of ions which 1 mol of ionic compound produces on being dissolved in water will be ($K_f = +1.86^\circ$ C/m)

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

9. A solution of sucrose (molar mass 342 gmol^{-1}) has been produced by dissolving 68.5g sucrose in 1000g water. The freezing point of the solution obtained will be (K_f for H_2O= 1.86 kg mol^{-1})

A. $-0.372^{\circ}C$

B. $-0.520^{\circ}C$

C. $+0.372^{\circ}C$

D. $-0.570^{\circ}C$

Answer: C

Watch Video Solution

10. The van't Hoff factor i for a compound which undergoes dissociation in one solvent and association in other solvent is respectively

A. greater than one and greater than one

B. less than one and greater than one

C. less than one and less than one

D. greater than one and less than one

Answer: D

Watch Video Solution

11. The freezing point depression constant for water is $-1.86^{\circ}Cm^{-1}$. If 5.00g Na_2SO_4 is dissolved in 45.0 g H_2O the freezing point is changed by $-3.82^{\circ}C$, calculate the van't Hoff factor for Na_2SO_4.

A. 0.381

B. 2.63

C. 2.05

D. 3.11

Answer: B

Watch Video Solution

12. P_A and P_B are the vapour pressure of pure liquid components. A and B, respectively of an ideal binary solution. If x_A represents the mole fraction of component A, the total pressure of the solution will be

A. $P_B + x_A(P_B - P_A)$

B. $P_A + x_A(P_A - P_B)$

C. $P_A + x_A(P_B - P_A)$

D. $P_B + x_A(P_A - P_B)$

Answer: D

Watch Video Solution

13. Which of the following compounds can be used as antifreeze in automobile radiators ?

A. Mehyl alcohol

B. Glycol

C. Nitrophenol

D. Ethyl alcohol

Answer: B

Watch Video Solution

14. 6.02×10^{20} molecules of urea are present in 100 mL. of its solution. The concentration of solution is

A. 0.1M

B. 0.001M

C. 0.01M

D. 0.02M

Answer: C

Watch Video Solution

15. Of the following 0.10 m aqueous solutions, which one will exhibit the largest freezing point depression ?

A. K_2SO_4

B. $Al_2(SO_4)_3$

C. $C_6H_{12}O_6$

D. KCl

Answer: B

Watch Video Solution

16. The boiling point of 0.2 mol kg^{-1} solution of X in water is greater than equimolal solution of Y in water, Which one of the following statements is true in the case ?

A. Molecular mass of X is less than the molecular mass of Y.

B. Y is undergoing dissociation in waer while X undergoes no change

C. X is undergoing dissociation in water

D. Molecular mass of X is greater than the molecular mass of Y

Answer: C

Watch Video Solution

17. Mole fraction of the solute in a 1.00 molal aqueous solution is

A. 0.0354

B. 0.0177

C. 0.171

D. 1.770

Answer: B

Watch Video Solution

18. Which one of the following electrolytes has the same value of van't Hoff factor (i) is that of $Al_2(SO_4)_3$ (if all are 100% ionised) ?

A. $Al(NO_3)_3$

B. $K_4[Fe(CN_6)]$

C. K_2SO_4

D. $K_3[Fe(CN_6)]$

Answer: B

Watch Video Solution

19. At 100° C the vapour pressure of a solution of 6.5 gm of a solute in 100 gm of water is 732 mm. If K_b = 0.52, the boiling point of this solution will be

A. $102^\circ C$

B. $103^\circ C$

C. $101^\circ C$

D. $100^\circ C$

Answer: C

Watch Video Solution

20. The percentage of pyridine (C_5H_5N) that forms pyridinium ion $\left(C_5H_5N^+H\right)$ in a 0.10M aqueous pyridine solution (K_b for $C_5H_5N = 1.7 \times 10^{-9}$) is

A. $0.0060\ \%$

B. $0.013\ \%$

C. $0.77\ \%$

D. $1.6\ \%$

Answer: B

Watch Video Solution

21. The van't Hoff factor (i) for a dilute aquoues solution of the strong electrolyte barium hydroxide is

A. 0

B. 1

C. 2

D. 3

Answer: D

Watch Video Solution

22. Which one of the following is incorrect for ideal solution ?

A. $\Delta H_{\text{mix}} = 0$

B. $\Delta U_{\text{mix}} = 0$

C. $\Delta P = P_{\text{obs}} - P_{\text{calculated Raoult's law}} = 0$

D. $\Delta G_{\text{mix}} = 0$

Answer: D

View Text Solution

23. If molality of the dilute solution is doubled, the value of molal depression constant $\left(K_f\right)$ will be

A. unchanged

B. doubled

C. halved

D. tripled

Answer: A

Watch Video Solution

24. A mixture of 2.3 g formic acid and 4.5 g oxalic acid is treated with conc. H_2SO_4. The evolved gaseous mixture is passed through KOH pellets. Weight (in g) of the remaining product at STP will be

A. 2.8

B. 3.0

C. 1.44

D. 4.4

Answer: A

Watch Video Solution

Objective Exercise 4

1. Assertion : Molarity of a solution decreases with an increase of temperature

Reason : As temperature increases volume of the solution increases.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

2. Assertion : Molality is independent of temperature

Reason : There is no volume factor in the expression of molality

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

3. Assertion : Mole fraction has no units

Reason: Mole fraction is a ratio of number of moles of solute to number of moles of solvent

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: C

Watch Video Solution

4. Assertion: Pressure does not have significant effect on solubility of solids in liquids

Reason : Solids and liquids are highly incom pressible

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

View Text Solution

5. Assertion: Increase in temperature increases vapour pressure of a liquid

Reason : Volume of a solution increases by increasing the temperature.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

View Text Solution

6. Assertion :Rate of evaporation increases with an increase in the surface area of the vessel

Reason : Evaporation is a surface phenomenon

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

7. Assertion : Sea water boils at higher temperature than distilled water

Reason : Addition of non volatile solute to a solvent lowers the vapour pressure

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

8. Assertion: A pressure cooker reduces cooking time

Reason: The boiling point of water inside the cooker is increased

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

9. Assertion : Vapour pressure of 0.5M sugar solution is more than 0.5M KCl solution

Reason: Lowering of vapour pressure is directly proportional to the number of particles present in the solution

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

10. Assertion : For two solutions, 0.1m aqueous solution of glucose and 0.1 m urea in benzene, the lowering of vapour pressure is same.

Reason : Vapour pressure is always lowered when volatile solute is added to water

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

11. Assertion: If one component obeys Raoult's law over a certain range of composition, the other component would not obey Henry's law in that range

Reason: Raoult's law concept is not related to Henry's law

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

12. Assertion: A solution is a homogeneous mixture of two or more chemically non-reacting substances.

Reason : Solutions can be made between any two states of matter.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

13. Assertion: The solubility of the gas in a liquid increa ses with increase of pressure.

Reason : The solubility of a gas in a liquid is directly proportional to the pressure of the gas.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

14. Assertion: One molal aqueous solution of urea con tains 60g of urea in 1000g of water.

Reason : Solution containing one mole of solute in 1000g solvent is called as one molal solution.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

15. Assertion: One molar aqueous solution (d=1gm/cc) has always higher concentration than one molal.

Reason: The molality of a solution does not depends on temperature whereas molarity depends

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

16. Assertion: The pressure exerted by the vapour of a liquid at equilibrium at a given temperature is called its vapour pressure.

Reason: If a nonvolatile solute is added to a solvent to give a solution, the vapour pressure of the solution is found to be greater than the vapour pressure of the pure solvent.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: C

Watch Video Solution

17. Assertion: At the same temperature water has higher vapour pressure than acetic acid.

Reason : Hydrogen bonding in water is weaker than in acetic acid.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

View Text Solution

18. Assertion: Osmotic pressure is a colligative property.

Reason: Osmotic pressure depends only on the number of non volatile

particles dissolved in solution

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

19. Assertion:Vapour pressure of water is less than 373K at 1.013 bar.

Reason: Water boils at 273K as the vapour pressure at this temperature becomes equal to atmospheric pressure

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

20. Assertion: Azeotropic mixtures are formed only by non-ideal solutions and they may have boiling points either greater than both the components or less than both the components.

Reason: The composition of the vapour phase is same as that of the liquid phase of an azeotropic mixture.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

21. Assertion: In diffusion the flow of solvent molecules occur in one direction only.

Reason: In osmosis the flow of solvent molecules occur in both directions

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

22. Assertion: If blood cells are placed in pure water, they swell and burst Reason: Due to osmosis, the movement of water molecules into the cell dilutes the salt content.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

23. Assertion:Reverse osmosis is used in the desalination of sea water.

Reason: When pressure more than osmotic pressure is applied, pure water is squeezed out of the sea water through the membrane.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

24. Assertion:If more and more solute is added to a solvent, the freezing point of the solution keeps on becoming higher and higher

Reason : Presence of large amount of the solid solute does not allow the solution to freeze

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

25. Assertion:The molecular mass of acetic acid in benzene is more than the actual value of the solute.

Reason: Molecules of acetic acid dimerise in benzene due to hydrogen bonding.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

26. Assertion:NaCl in water and organic acids in benzene show abnormal molecular mass.

Reason : Abnormal molecular mass is obtained when the substance in the solution undergoes either dissociation or association.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

27. Assertion:Solutions of identical concentrations always have same osmatic pressure

Reason: Number of particles present in solutions is same if molar concentrations is same

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

28. Assertion:During the formation of solution entropy of system increases

Reason : Disorderliness decreases upon dissolution of solute to form a solution

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: C

Watch Video Solution

29. Assertion: Isotonic solutions do not show osmosis.

Reason: Isotonic solutions have equal osmotic pressure.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

30. Assertion: The relative lowering of vapour pressure for $CH_3COOH + H2O$ solution is more in comparison to

$CH_3COOH + C_2H_6$

Reason: Water is less volatile than benzene.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

View Text Solution

31. Assertion: If two liquids on mixing form a solution with liberation of heat, it is a non ideal solution with negative deviation.

Reason: Solutions with negative deviation are accompanied by decrease in volume.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

32. Assertion:When methanol is added to water boiling point of water decreases.

Reason: Methanol when added to water gives a non ideal solution with negative deviation.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: C

View Text Solution

33. Assertion:Camphor is used as solvent in the experi mental determination of molecular mass of naphthalene and anthracene

Reason: Camphor has high cryoscopic constant

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

34. Assertion:Addition of salt decreases the freezing point of water.

Reason: When salt is added to water, the equilibrium between water and ice is disturbed as fewer water molecules reach the surface of the ice in a given time and so water freezes slowly

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

35. Assertion:Ethylene glycol is added to water and used as antifreeze in the radiators of auto-mobiles.

Reason: Addition of ethylene glycol lowers the freezing point of water.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

36. Assertion:Osmotic pressure of 0.1M glucose is less than 0.1M $MgCl_2$ solution.

Reason: Colligative properties do not depend on the concentration of solution.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: C

Watch Video Solution

37. Assertion:Ideal solutions follow Raoult's law.

Reason: ΔH and ΔV of ideal solutions are zero

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

Watch Video Solution

38. Assertion:Van't Hoff factor for electrolytes is always greater than unity.

Reason: Electrolytes undergo dissociation in polar solvents like water.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

39. Assertion:Aqueous solution of urea is ideal.

Reason: Ideal solutions can not follow Raoult's law.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

Watch Video Solution

40. Assertion:Ether has higher vapour pressure than water at a given temperature.

Reason: Water has stronger inter molecular forces than ether.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

41. Assertion: When NaCl is added to water a depression in freezing point is observed

Reason: The lowering in vapour pressure of a solution causes depression in freezing point.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

Watch Video Solution

42. Assertion:When $CuSO_4$ is dissolved in water, the solution is warmed up.

Reason: Hydration energy of $CuSO_4$ is higher than its lattice energy

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

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43. Assertion:The sum of mole fractions of all components of a solution is unity.

Reason: Mole fraction is independent of temperature.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

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44. Assertion: Benzene and toluene form an ideal solution.

Reason: Successive homologues generally form ideal solutions.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

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45. Assertion: Elevation in boiling point is inversely proportional to lowering of vapour pressure for dilute solutions.

Reason: Lowering of vapour pressure is directly proportional to mole fraction of solvent.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

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46. Assertion:When a solution of non-volatile solute in water is cooled slightly below its freezing temperature, some ice separates out and then freezing stops.

Reason: Separation of ice increases the molality of the left over solution.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

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47. Assertion:When dry air is passed continuously through an aqueous solution of non-volatile solute, vapour pressure of solution decreases gradually.

Reason: Some air absorbed in the solution.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

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48. Assertion: van't Hoff factor of NaCl is expected to be equal to 3

Reason: NaCl is a binary electrolyte

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: D

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49. Assertion: 0.1M glucose, 0.1M urea solutions cause the same osmotic pressure in solution.

Reason: Osmotic pressure is a measure of the number of particles present in the solution

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: A

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50. Assertion: The vapour pressure of mixture of ethanol and water is greater than pure water.

Reason: Ethanol & water form an azeotropic mixture.

A. Both Assertion and Reason are true and Reason is the correct explanation of Assertion

B. Both Assertion and Reason are true and Reason is not the correct explanation of Assertion

C. Assertion is true but Reason is false

D. Both Assertion and Reason are false

Answer: B

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